March 6, 1945. M. J. THOMPSON 2,370,759

HYDROCOLLOID DISPENSING SYRINGE

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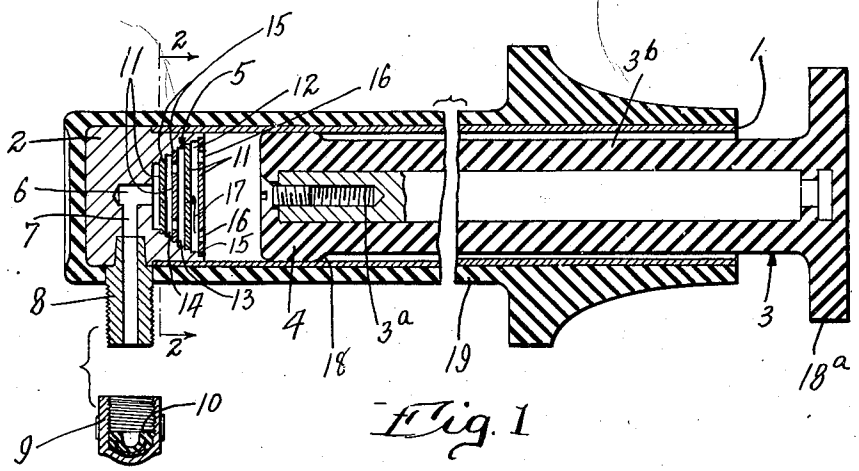


Fig. 1

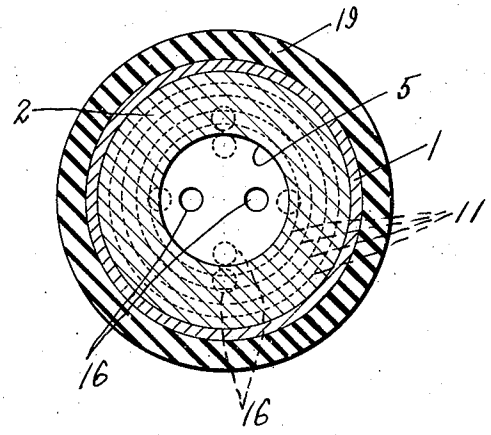


Fig. 2

Inventor

Morris J. Thompson

By Lyon & Lyon

Attorneys

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HYDROCOLLOID DISPENSING SYRINGE

Morris J. Thompson, Los Angeles, Calif.

Application December 15, 1941, Serial No. 422,969

1 Claim. (Cl. 259—47)

This invention relates to hydrocolloid dispensing syringes and more particularly to the production of a syringe adapted for the handling of dental hydrocolloids for the purpose of mixing and dispensing such hydrocolloids.

This application is a continuation-in-part of my application, Serial No. 305,488, filed November 21, 1939, for Method of and apparatus for taking an impression of a cavity for dental inlay.

Dental hydrocolloids of the type including a mixture of ingredients, for example agar, etc., exhibits a tendency to separate. The accuracy of the impressions made using these materials is dependent upon the use of a homogeneous mixture. These dental hydrocolloids are ordinarily rendered fluid at temperatures ranging upward from approximately 195° F. to boiling. Maintaining these dental hydrocolloids in a heated fluid condition results in an increased tendency toward separation.

In making dental impressions, it is desirable to have such dental hydrocolloids conditioned as to temperature and fluidity so that they may be subject to immediate use without the necessity of the dentist waiting for the material to be brought to the requisite consistency for use. The maintaining of dental hydrocolloids at elevated temperatures for long periods of time tends to break the mixture, to separate the fluid therefrom, and to render the same non-homogeneous so that they do not act as effectively in the production of an impression as where they are used as a homogeneous mixture.

It is therefore an object of this invention to provide a dispensing syringe applicable for the handling of dental hydrocolloids and in which the dental hydrocolloids may be heated and maintained in the heated condition requisite for maintaining the desired fluidity thereof, and wherein means are provided for re-mixing the hydrocolloid as it is dispensed to insure the dispensing of a homogeneously mixed material.

Other objects and advantages of this invention it is believed will be apparent from the following detailed description of a preferred embodiment thereof as illustrated in the accompanying drawing.

In the drawing:

Figure 1 is a sectional side elevation of a hydrocolloid dispensing and mixing syringe embodied in my invention.

Figure 2 is a sectional end elevation taken substantially on the line 2—2 of Figure 1 and of an enlarged size.

In the preferred embodiment of my invention as illustrated in the accompanying drawing, the dispensing and mixing syringe is composed of a cylinder 1 open at one end and secured to a head 2 at the other end. A plunger 3 having a plunger head 4 fitting within the bore of the cylinder 1 is mounted to be reciprocated therein. The head 2 has formed therein a mixing chamber 5 from which the discharge port 6 extends substantially axially of the cylinder 1. A branch discharge passage 7 extends at an angle from the discharge port 6 so as to extend from the side of the syringe. The head 2 may be formed with a boss extension 8 through which the passage 7 is formed. The boss 8 is threaded to receive a cap 9 carrying a closure washer 10 to close the discharge passage 7.

Mounted within the mixing chamber 5 are a plurality of mixing discs 11 which are spaced apart to provide mixing passages 12, 13 and 14 through which the direction of the hydrocolloid is reversed as it is discharged. The closer the spacing of these discs 11 in the chamber 5, the more effected will be the mixing. In practice I prefer to space the discs to form the passages 12, 13 and 14 of a width of approximately $\frac{1}{32}$ of an inch. Closer spacing of the discs restricts too greatly the discharge.

As herein illustrated, the discs 11 are supported upon steps 15 formed in the mixing chamber 5. Each disc 11 is formed with a pair of radially opposed mixing apertures 16 and the discs are rotated as supported upon their steps 15 so that the mixing apertures are spaced apart approximately 90°. In this manner the hydrocolloid in passing through the mixing chamber is thoroughly mixed in following the reversing paths as indicated by the arrow 17 before passing through the discharge passages 6 and 7. The forcing of the hydrocolloid through the mixing apertures 16 and passages 12, 13 and 14 causes re-mixing by alternately changing the direction of flow, and alternately expanding and contracting the dimensions of the stream during the flow.

The plunger 3 may be of any suitable or desirable construction and as herein illustrated, includes a rod drilled at one end as indicated at 3^a to receive a holding rod for suspending the rod 3^a in a mold in which the rubber covering 3^b is molded to form the plunger with a head 18 and an operating flange 18^a.

The dispensing and mixing syringe embodied in my invention is particularly adapted for the handling and mixing of dental hydrocolloids for use in (*a*) filling trays for the making of full or partial mouth impressions; (*b*) for filling smaller

cavity inlay impression injection syringes, or (c) for merely reconditioning or mixing dental hydrocolloids which may have separated and would therefore be in condition unsuitable for use in the making of impressions.

It is desirable to cover its exterior with a material which will enable the same to be handled without danger of burning the operator's fingers. I have found that by molding a sleeve 19 of rubber around the cylinder 1 and head 2, that the syringe may be handled without danger of burning or without discomfort to the dentist. The sleeve 19 is molded onto the cylinder 1 and head 2 in a one-piece molding. The forming of the rubber sleeve around the plunger 3 also enables this to be handled without danger or discomfort.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details herein set forth, but my invention is of the full scope of the appended claim.

I claim:

In a dental hydrocolloid mixing syringe, the combination of a cylinder having a head at one end with a discharge passage formed therethrough, a plunger mounted in the cylinder to force hydrocolloid through the head discharge passage, a mixing chamber interposed in the cylinder between the discharge passage and the plunger, and a plurality of closely spaced apertured mixing discs mounted within the mixing chamber with their apertures staggered to provide relatively fine mixing passages for reverse directing of the flow of the dental hydrocolloid as it is forced from the cylinder into the head discharge passage.

MORRIS J. THOMPSON.